

REDESCRIPTION OF *ANIDOLYTA DUEBENI* (LOVÉN), A LITTLE KNOWN NOTASPIDEAN GASTROPOD

ANDERS WARÉN & GIACOMO DI PACO

ANDERS WARÉN & GIACOMO DI PACO. 1996. Redescription of *Anidolyta duebeni* (Lovén), a little known notaspidean Gastropod. - *Boll. Malacol.* 32 (1-4): 19-26.

Key words: Mediterranean, new record, systematics, Gastropoda, Opisthobranchia, Notaspidea, Tyloidinidae, *Tyloдина*, *Tyloдинella*, *Anidolyta*.

Abstract: *Anidolyta duebeni* (Lovén, 1846) (Tyloidinidae, Notaspidea, Opisthobranchia) is recorded from off Corsica, first Mediterranean record. The holotype as well as the new specimen are compared with the description of *Tyloдинella trinchessii* Mazzarelli, 1898 and found to differ from this one. This supports WILLAN's (1987) recognition of *Anidolyta* as a new genus with *Tyloдина duebeni* as the type species. Available information about *Tyloдинella trinchessii* does, however, not confirm it as a junior synonym of *Tyloдина perversa* (Gmelin, 1791), but the name is considered a *nomen dubium*.

Riassunto: *Anidolyta duebeni* (Lovén, 1846) (Tyloidinidae, Notaspidea, Opisthobranchia) è stata reperita per la prima volta in Mediterraneo, al largo della Corsica. L'olotipo e il nuovo esemplare sono stati confrontati con la diagnosi della *Tyloдинella trinchessii* Mazzarelli, 1898, riscontrando diversità rispetto a questa specie. Ciò conferma l'istituzione da parte di WILLAN (1987) di *Anidolyta* come nuovo genere con *Tyloдина duebeni* come specie tipo. Le informazioni disponibili per quanto concerne *Tyloдинella trinchessii* non sembrano tuttavia confermare che si tratti di un sinonimo jun. di *Tyloдина perversa* (Gmelin, 1791) e pertanto *Tyloдинella* è da considerarsi *nomen dubium*.

ANDERS WARÉN, Naturhistoriska Riksmuseet, Box 50007, S-10405 Stockholm, Sweden.
GIACOMO DI PACO, Via L. Settembrini 38, I-57100 Livorno, Italy.

Introduction

The Notaspidea is a rather small order of spongivorous opisthobranchs with slightly more than a dozen species in the Mediterranean (SABELLI *et al.* 1992). There has been some confusion about the validity of at least one of these species, *Tyloдинella trinchessii* Mazzarelli, 1898 (:600, plates 23-24), described from the Gulf of Naples (Italy, the rock of Benta Palumma, 70 m). It is the type species of *Tyloдинella* Mazzarelli, 1898, by monotypy. MAZZARELLI's description was based on a single, serially sectioned specimen, which is of little used for the external morphology and useless for the radula.

WILLAN (1987) reviewed and slightly modified the classification of the Notaspidea. In that paper *Tyloдинella trinchessii* was considered to be based on a juvenile *Tyloдина perversa* (Gmelin, 1790) and therefore *Tyloдинella* became an absolute junior synonym of *Tyloдина* (based on the same type species). This was contrary to ODHNER (1939:14) who considered *T. trinchessii* based on a species closely related to *T. duebeni* Lovén, 1846 and for the latter species used the generic name *Tyloдинella*. WILLAN also introduced a new genus *Anidolyta*, with *Tyloдина duebeni* as type species.

Species of *Anidolyta* are very rare and less than five specimens were known to WILLAN (1987: 233) of which three had been examined. It was therefore of considerable interest when

the senior author received a specimen for identification.

Examination of that specimen and the holotype of *A. duebeni* showed that they are based on the same species, and therefore, that *A. duebeni* occurs in the Mediterranean. Preparation of the radulae of *T. perversa* and *A. duebeni* also made it possible to correct earlier descriptions of this organ.

Material & Methods

For comparison we have used specimens from the Swedish Museum of Natural History, Stockholm (SMNH). The shell of the new specimen of *Anidolyta duebeni* is in the collection of the junior author.

Class GASTROPODA
Subclass OPISTHOBANCHIA
Order NOTASPIDEA
Family TYLODINIDÆ
Anidolyta Willan, 1987

Anidolyta Willan, 1987: 232. Type species *Tylodina duebeni* Lovén, 1846, by original designation, western Norway.

Remarks. WILLAN (1987) enumerated several similarities between *T. trinchessii* and *T. perversa* (Gmelin, 1791) and concluded that *Tylodinella trinchessii* was based on a young *Tylodina perversa*.

We list these similarities italicized in quotation marks below, with some comments:

- "*Animal* [of *T. trinchessii*] pale yellow". Purple in *A. duebeni* (Lovén 1846), brownish purple in our Corsican specimen, yellow in *T. perversa*.
- "Thin, circular, conical shell". Not conclusive. MAZZARELLI's figures show a shell which is taller than a young *T. perversa*, and even taller than that of *Anidolyta duebeni*.
- "Small oral veil". Not well enough described or known in *A. duebeni* to allow comparison.
- "Eyes". "Situated at the base and slightly in front of the rhinophores" (MAZZARELLI 1898: 597). Situated between and slightly behind the point where the rhinophores rise in *A. duebeni*; in front of the rhinophores in *T. perversa* (ODHNER 1939:14).
- "Position of gill, anus and penis"; "structure of gill and nervous system" and "division of stomach" are not known well enough in *A. duebeni* to allow comparison.
- "Radula". The radula was not figured by MAZZARELLI except in cross section, but described as: "The radula, contrary to *Tylodina*, but resembling the pleurobranchs has no median tooth... The teeth have a short and narrow blade, and a robust, recurved point as the point of a cork-screw." ODHNER failed to find a central tooth in *A. duebeni*; he gave a size of the teeth of 20 µm but our measurements of the slide of the holotype gave a size closer to 10 µm. WILLAN (1987) and MARCUS (1985) assumed that "these very fine [central] teeth had been lost during MAZZARELLI's preparation of the radula", and thus, they considered the radula is identical with that of *T. perversa*. This is hardly correct. It is very unlikely that the teeth should be lost in a sectioned specimen; they may be absent, but it is more likely that they were not recognised.

As a result of these "similarities" WILLAN concluded that *T. trinchessii* was based on a young *T. perversa* and ascribed the fact that the soft parts could be contained within the shell to its

assumed juvenile condition. We have seen a single small *T. perversa* and it is correct that the soft part then can be contained within the shell. Furthermore, WILLAN concluded that the immature state misled MAZZARELLI to describe the sexual system as diallic instead of monaulic.

A basic mistake in WILLAN'S evaluation of these characters was that they were not compared, compared with *Tylodina duebeni* and thus the possibility of synonymy with that species, were overlooked.

We find that the color of the animal and the position of the eyes support affinity with *T. perversa*, but the shape of the shell and diallic reproductive system favor relations with *T. duebeni*. The radular structures as described by MAZZARELLI are not conclusive. ODHNER'S description of the radula of *T. duebeni* agrees with our Fig. 3, except that ODHNER did not find a central tooth. This discrepancy we can understand after examining LOVÉN'S slide of the holotype, which is not easy to interpret, but a central tooth seems to be there.

As a conclusion, we can not share WILLAN'S conviction that *T. trinchessii* was based on a young *T. perversa*, but recognise three possibilities: 1.) *Tylodinella trinchessii* was based on a young *T. perversa*, a hypothesis supported by the colour and the position of the eyes. 2.) *Tylodinella trinchessii* was based on a specimen of *T. duebeni*, supported by the diallic reproductive system. 3.) *Tylodinella trinchessii* was based on a species that so far not has been found again, supported by the differences with both *T. perversa* and *T. duebeni* and by the fact that these species, as stated by WILLAN, are very rare.

We do not favour any of these over the others. The nomenclatorial consequences of our opinion will not change presently accepted names, unless it is proved that 2.) is correct, in which case *Anidolyta* becomes an objective junior synonym of *Tylodinella*.

The SEM figures of the radula of *T. duebeni*, presented here, support WILLAN'S (1987) opinion that *Roya spongothoras* Bertsch, 1980, from the North Pacific is congeneric with *T. duebeni*.

Anidolyta duebeni (Lovén, 1846)

Tylodina duebeni Lovén, 1846: 151. *Tylodinella duebeni*:- Odhner 1939: 14, Figs 2-3.

Type locality. Western Norway, Bergensfjord (=Byfjorden), close to Ask, 360 m. Type material. Holotype SMNH type collection reg. n° 978 (soft parts) and 1517 (shell and radula).

Additional material examined. Corsica, north of Cape Corse, SW of Banco S. Lucia, 43.4°N, 09.6°E, 382-492 m, among "white coral", collected by Silverio Curcio and Silverio Romano, owners of the fishing boat "S. Lucia II", who gave the specimen to the junior author (see BIONDI & DI PACO 1996). PORCUPINE Expedition 1870, station 24, southwest of Portugal, 37°19'N, 09°13'W, 531 m, 1 shell, SMNH.

Distribution. In addition to the material above, western Norway and Corsica, known from one more record off southwestern Portugal, PORCUPINE EXPEDITION 1870 station 27, depth 360 m. Records from Denmark, Helsingør, 21-25 m (SYKES 1905: 327) and Hællebaek (MORCH 1871: 178) are suspect because of the small depth and need confirmation.

Redescription

Shell (Fig. 1) up to ca 12 mm in diameter, slightly larger in diameter than high, with a smooth, easily peeling periostracum. Anterior slope convex, posterior one straight. Sculpture, only concentric growth lines. Interior muscle scar forms a complete circle. Protoconch

hyperstrophic, diameter 400-500 μm , smooth with 1.7 whorls of rapidly expanding diameter, presumably indicating planktotrophic development. *Soft parts* (mainly after ODHNER 1939) completely contained within the shell. Pallial margin with scattered papillae, 0.1 mm diameter, 0.2-0.3 mm apart anteriorly. Rhinophores twice as large as oral tentacles, with wide furrow. Eyes between rhinophores, just behind anterior part of their base. Male and female genital openings separate. Soft parts and periostracum purplish brown. Intermediate suspension muscle and corresponding scar absent. Radula (Fig. 3). About 80 transverse rows, each with about 75 teeth on each side of the central tooth. Central tooth hook-shaped with a single large cusp; lateral teeth laminar with three cusps in a vertical row.

Remarks. The soft parts of the Corsican specimen were not in good condition and it was not possible to discern any details, except a large foot. The colour was dark brownish purple. The radula and shell, however, confirmed the identity with *T. duebeni* as far as presently can be done.

Most of the knowledge about *Anidolyta*, at least the taxonomically useful characters, originates from ODHNER'S (1939) redescription of *T. duebeni*, based on the holotype in SMNH. MAZZARELLI'S description was largely based on a sectioned specimen, which is less useful for external morphology and useless for the radula. Furthermore, the radular teeth are small, numerous, and crowded, which makes light microscopical investigation unreliable.

A good character for separation of shells of *Tyrodina* from *Anidolyta* is the presence of the very strong muscle scar of the intermediate suspension muscle (Fig. 2C-D), which muscle is absent in *A. duebeni*.

For comparison of the radular characters we figure the radula of a specimen of *Tyrodina perversa* (SMNH 901, Canary Islands, Tenerife, Puerto de Orotava, Leg. A. Tullgren 10 July 1896). For comparison of shell characters we have used a specimen of *Tyrodina cf. perversa*, from off southwestern Portugal (SEAMOUNT 1 station DE10, Gorringe Bank, 36°27.4'N, 11°35.0'W, 540-545 m depth, on *Suberites ficus* Johnston, 1842, kept in Museum National d'Histoire Naturelle, Paris). The sponge on which this specimen was found is not the regular host of *T. perversa*, which in the Mediterranean always occurs on *Verongia aerophoba* (Schmidt) (Dictyoceratida, Verongidae).

Acknowledgements

Dr O.Tendal (Copenhagen) is thanked for identification of the host sponge of *Tyrodina perversa*. C. Hammar (SMNH) prepared all photographic prints. P. Bouchet (Paris) gave useful comments on the manuscript.

REFERENCES

- BIONDI F. & G. DI PACO 1996. Segnalazione di *Emarginula christiaensi* (Piani, 1984) vivente in Mediterraneo (Mar Ligure) (Archaeogastropoda: Fissurellidae). *La Conchiglia* **278**: 17-20
- LOVÉN S. 1846. Index Molluscorum litora Scandinaviae occidentalia habitatum. - Ofversigt ofver Kongliga Svenska Vetenskaps Akademiens Forhandlingar; **3**: 134-160, 182-204.
- MARCUS E. de B.-R. 1985. The Western Atlantic warm water Notspidea (Gastropoda, Opisthobranchia). *Boletim de Zoologico, Univ. Sao Paulo*; **9**:1-15.
- MAZZARELLI G. 1897. Contributo alla conoscenza delle Tyrodinidae, nuova Famiglia del gruppo dei molluschi tectibranchi. *Zoologische Jahrbucher, Abteilung fur Systematik, Geographie und*

Biologie; **10**: 596-608.

MORCH O. A. L. 1871. Synopsis molluscorum marinorum Daniae. *Videnskablige Meddelelser fra den Naturhistoriske Forening i Kjobenhavn*; **1871**: 157-225.

ODHNER N. H. 1939. Opisthobranchiate Mollusca from the western and northern coasts of Norway. *Det Kongelige Norske Videnskabers Selskabs Skrifter* 1939(1) (and: *Meddelelse fra Trondheims Biologiske Stasjon*; **115**): 1-93.

SABELLI B., R. GIANNUZZI-SAVELLI & D. BEDULLI, 1992. *Annotated check-list of Mediterranean marine mollusks*. 2: Ed. Libreria Naturalistica Bolognese, pp. 348-499.

SYKES E. R. 1905. On the Mollusca procured during the "Porcupine" Expeditions, 1869-1870. Supplemental notes. Part 2. *Proceedings of the malacological Society of London*; **6**: 322-332

WILLAN R.C. 1987. Phylogenetic systematics of the Notaspidea (Opisthobranchia) with reappraisal of families and genera. *American Malacological Bulletin*; **5**: 215-241.

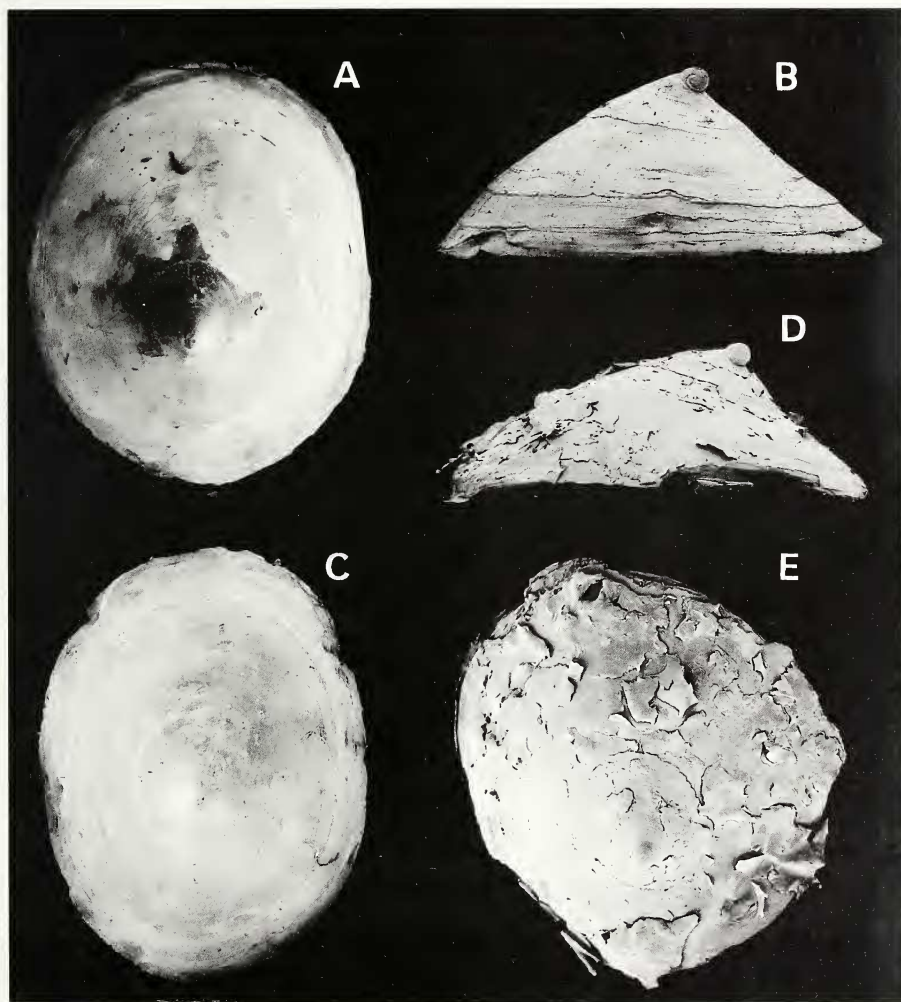


Figure 1. *Anidolyta duebeni* and *Tyrodina perversa*, shell details. A. *Anidolyta duebeni*, protoconch, from north of Cape Corse. B. *T. duebeni*, holotype. C-D. *Tyrodina perversa*, SEAMOUNT 1 DE10, diameter 5.7 mm and detail of muscle scar. Scale lines 100 µm.

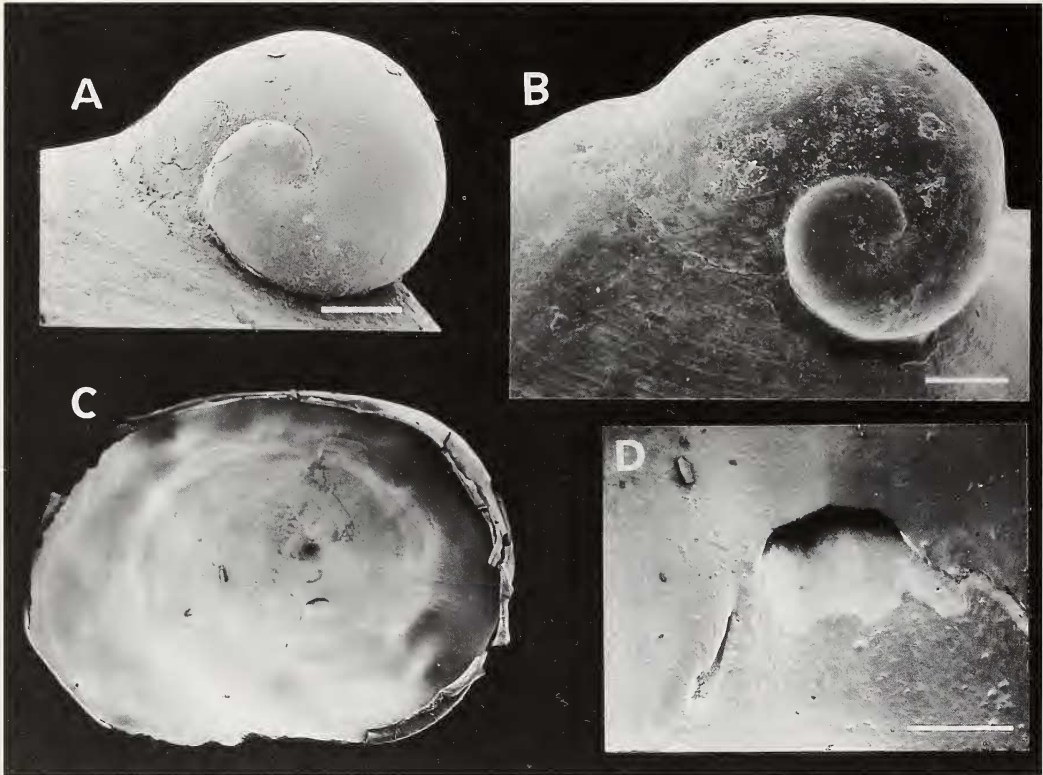


Figure 2. *Anidolyta duebeni*, shells. A. Holotype, diameter 11.5 mm. B-C. PORCUPINE EXP sta 24, diameter 6.8 mm. D-E. From north of Cape Corse, diameter 6.4 mm

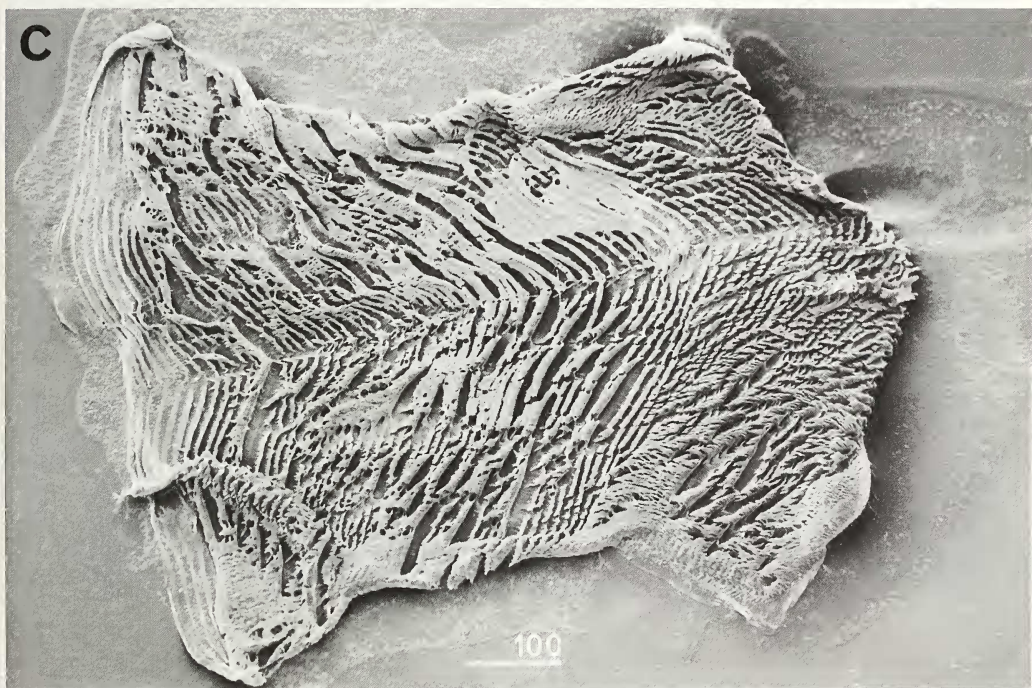
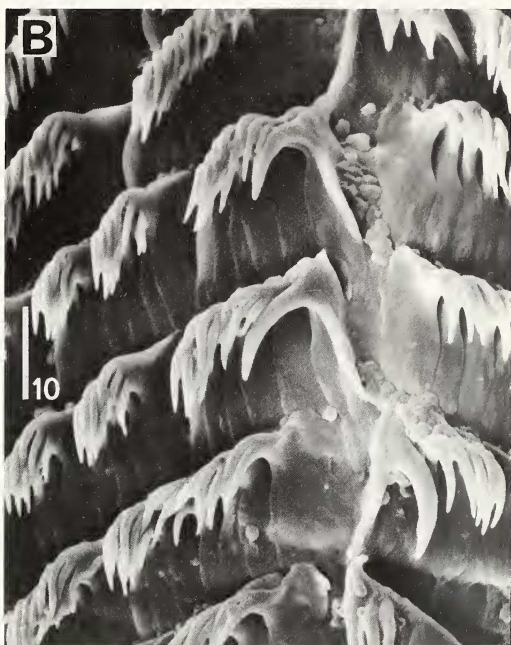


Figure 3. *Anidolyta duebeni*, north of Cape Corse, radula. A. Central part of radula. B. Oblique view of central teeth. C. Complete radula. Scale lines in μm .

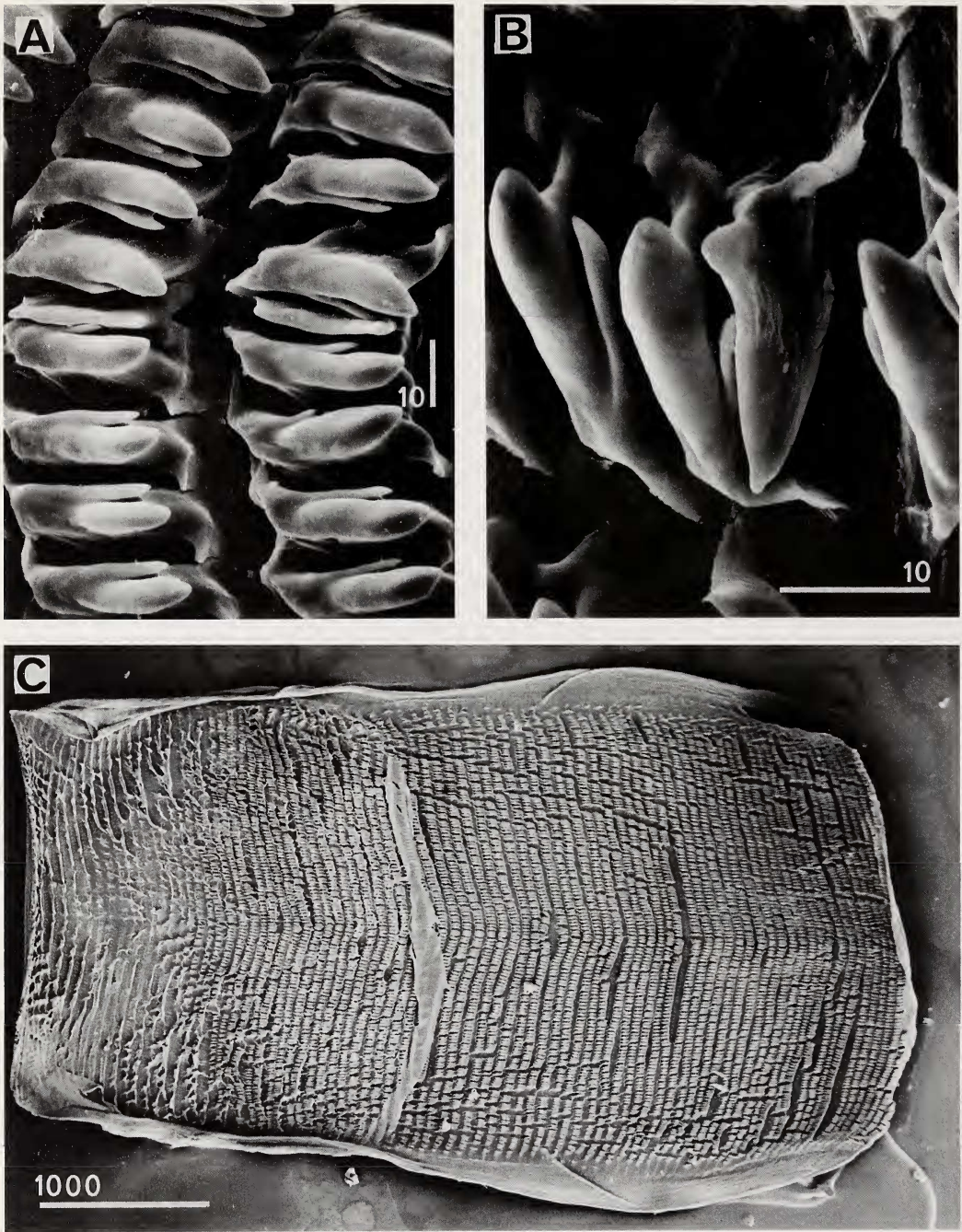


Figure 4. *Tylodina perversa*, Canary Islands, radula. A. Detail of central field; central tooth indicated with an arrow. B. Obliquely lateral view of central tooth. C. Complete radula. Scale lines in μm .